

Practice: 643 - Restoration and Management of Rare and Declining Habitats**Scenario: #1 - Rare or Declining Habitat Monitoring and Management, Oyster Reef Habitat Monitoring Medium****Scenario Description:**

This scenario is for monitoring the progress of native oyster reef restoration to make recommendations on adaptive management to improve the restored habitat. Monitoring will include temperature, salinity, dissolved oxygen, substrate type, submerged vegetation, oyster survival rates and other data listed in Conservation Practice Job Sheet - Oyster Monitoring. Reef habitats will be monitored twice per season. A boat will be required to gain access to the site and diving may be required to collect the required data. All information will be documented on the data collection sheets provided.

Before Situation:

Rare or declining habitat is deficient due to the absence of annual monitoring and adaptive management actions of medium intensity and complexity.

After Situation:

Rare or declining habitat is improved by implementation of annual adaptive management actions of medium intensity and complexity.

Scenario Feature Measure: Monitoring efforts and adaptive management actions

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$2,111.68

Scenario Cost/Unit: \$2,111.68

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Boat, 150 HP	2407	22 foot boat with 150hp motor used to place cultch to create reef habitat.	Hour	\$166.76	4	\$667.04
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$101.60	8	\$812.80
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$39.49	16	\$631.84

Practice: 643 - Restoration and Management of Rare and Declining Habitats**Scenario: #2 - Habitat Monitoring and Management, High Intensity and Complexity****Scenario Description:**

This scenario is for monitoring the progress of native oyster reef restoration to make recommendations on adaptive management to improve the restored habitat. Monitoring will include temperature, salinity, dissolved oxygen, substrate type, submerged vegetation, oyster survival rates and other data listed in Conservation Practice Job Sheet -Oyster Monitoring. Additional disease monitoring will be completed to determine if specific diseases are impacting the reef organisms. Reef habitats will be monitored twice per season. A boat will be required to gain access to the site and diving may be required to collect the required data. All information will be documented on the data collection sheets provided.

Before Situation:

Rare or declining habitat is deficient due to the absence of annual monitoring and adaptive management actions of medium intensity and complexity.

After Situation:

Rare or declining habitat is improved by implementation of annual adaptive management actions of medium intensity and complexity.

Scenario Feature Measure: Monitoring efforts and adaptive management actions

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$3,330.88

Scenario Cost/Unit: \$3,330.88

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Boat, 150 HP	2407	22 foot boat with 150hp motor used to place cultch to create reef habitat.	Hour	\$166.76	4	\$667.04
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$39.49	16	\$631.84
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$101.60	20	\$2,032.00

Practice: 643 - Restoration and Management of Rare and Declining Habitats**Scenario: #3 - Development of Shallow Micro-Topographic Features with Normal Farming Equipment.****Scenario Description:**

This typical scenario is installed on open non-wetlands. The purpose is to increase plant species richness and diversity, create micro-habitats for invertebrates, increase water infiltration and reduce run-off. The area is plowed to loosen the soil. Then the soil is excavated with normal farming equipment (e.g. tractor and box-blade) to a depth of 2-6 inches and immediately deposited. This lowering and raising of a box-blade restores the original micro-topographic features (6' X 6' depressions and mounds) common to most landscapes and landforms prior to clearing, tilling, and annual mowing. Restoration of shallow but frequent micro-topographic features has been lost by the smoothing action of tillage, mowing and the original land-clearing. This scenario is typically implemented for ecosystem restoration projects such as prairie restoration and range-land restoration, and particularly on moderately well-drained soils.

Before Situation:

Micro-topographic features have been eliminated by past conversion to agriculture and/or past cultural practices. This has resulted in the lack of micro-soil moisture gradients within the field. The opportunity for plant species richness and diversity is minimal. Water storage potential is absent. Water rapidly runs off the field after rains and snow melt, carrying nutrients, solids and surface organic materials. No micro-ponding sites are available for invertebrate use.

After Situation:

Shallow micro-depressions and mounds are numerous. This varied micro-topographic features provided varied moisture gradients required for high plant species richness and diversity. Wildlife habitat is improved. Water conservation is increased, increasing vegetative production. Water quality is improved as the micro depressions capture sediments, nutrients and manure. Over time, the micro-depressions become more nutrient rich than the micro-highs, further increasing plant species richness.

Scenario Feature Measure: hours of tractor use

Scenario Unit: Acre

Scenario Typical Size: 20

Scenario Cost: \$805.14

Scenario Cost/Unit: \$40.26

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acre	\$16.14	20	\$322.80
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hour	\$56.09	6	\$336.54
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$24.30	6	\$145.80

Practice: 643 - Restoration and Management of Rare and Declining Habitats**Scenario: #4 - Development of Deep Micro-Topographic Features with Heavy Equipment.****Scenario Description:**

This typical scenario is installed on open non-wetlands, where micro-topographic features have been removed by past farming and/or ranching cultural practices. The purpose is to increase plant species richness and diversity, create micro-habitats for invertebrates, increase water infiltration and reduce run-off. The area is plowed 2 weeks prior to excavation to kill existing vegetation and allow for proper dirt work. Then the soil is excavated with track equipment (dozer) to a depth of 6-12 inches and immediately deposited. This lowering and raising of a dozer -blade restores the original deep micro-topographic features (10' X10' depressions and mounds) common to many landscapes and landforms prior to the lands conversion to agricultural lands. This scenario is typically implemented for ecosystem restoration projects such as wetland restoration (herbaceous or prior to planting of woody species), prairie restoration and range-land restoration. It is most commonly applied to well-drained soils as the purpose is for the micro-depression to pond water for short duration (less than 7 days).

Before Situation:

Micro-topographic features have been eliminated by past conversion to agriculture and/or past cultural practices. This has resulted in the lack of micro-soil moisture gradients within the field. The opportunity for plant species richness and diversity is minimal. Water storage potential is absent. Water rapidly runs off the field after rains and snow melt, carrying nutrients, solids and surface organic materials. No micro-ponding sites are available aquatic dependent invertebrates. Vertebrate wildlife habitat is lacking diversity.

After Situation:

Deep (6" - 12" depth) micro-depressions and mounds are numerous. These varied micro-topographic features provide varied moisture gradients required for development of high plant species richness and diversity. Wildlife habitat is improved. Water conservation is increased, increasing vegetative production. Water quality is improved as the deep micro-depressions capture sediments, nutrients and manure. Over time, the micro-depressions become more nutrient rich than the micro-highs, further increasing plant species richness.

Scenario Feature Measure: Hours**Scenario Unit:** Acre**Scenario Typical Size:** 20**Scenario Cost:** \$2,242.77**Scenario Cost/Unit:** \$112.14**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Dozer, 200 HP	928	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hour	\$191.50	6	\$1,149.00
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acre	\$16.14	20	\$322.80
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$33.69	8	\$269.52
Mobilization						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$501.45	1	\$501.45

Practice: 643 - Restoration and Management of Rare and Declining Habitats**Scenario: #5 - Vernal Pool Creation****Scenario Description:**

Creation of vernal pools to provide breeding habitats for amphibian species that are in decline. Vernal pools are usually located in forested landscapes. Vernal pools are usually 0.1-0.5 acres in size. Woody debris may be added to the vernal pools to improve the habitat.

Resource concerns include Inadequate Cover/Shelter. Practice 643 is being used in lieu of Wetland Creation because a vernal pool may not support permanent wetland vegetation. Associated practices include: 390 Riparian Herbaceous Cove, 460 Land Clearing.

Before Situation:

Forested landscape has limited number of vernal pools. Surrounding lands have been developed resulting in a decrease number of sites for amphibian breeding. Lack of breeding has caused a decrease in amphibian populations.

After Situation:

A vernal pool is created which provides additional cover/shelter for breeding amphibians. The amphibian population increases in the area of the vernal pool.

Scenario Feature Measure:

Scenario Unit: Acre

Scenario Typical Size: 0

Scenario Cost: \$2,623.42

Scenario Cost/Unit: #Div/0!

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$6.46	5	\$32.30
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$127.70	9	\$1,149.30
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$33.69	9	\$303.21
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$39.49	12	\$473.88
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$40.82	4	\$163.28
Mobilization						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$501.45	1	\$501.45

Practice: 643 - Restoration and Management of Rare and Declining Habitats**Scenario: #6 - Flash Grazing for Bog Turtle Habitat Restoration****Scenario Description:**

Landowners with habitat for Bog Turtles complete flash grazing to promote restoration and management of these habitats. This is usually carried out annually. Livestock are temporarily allowed to graze the habitat area. Stocking is 0.75 AU/Acre. A Biologist is required to locate all existing bog turtles and relocate during the flash grazing. Livestock are transported to the site for the grazing. Normally use cattle, sheep or goats depending on the availability of the livestock for grazing and the type of vegetation being grazed. Associated practices include: 472 Access Control. Resource Concerns include inadequate fish and wildlife habitat.

Before Situation:

Bog Turtle habitat is degraded due to an overgrowth of woody vegetation. The areas do not provide the necessary habitat to fully support the Bog Turtle.

After Situation:

After flash grazing the habitat regenerate to vegetation and a structure that is beneficial to the Bog Turtle.

Scenario Feature Measure:

Scenario Unit: Acre

Scenario Typical Size: 2

Scenario Cost: \$1,553.08

Scenario Cost/Unit: \$776.54

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$38.19	4	\$152.76
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$101.60	8	\$812.80
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$24.48	24	\$587.52

Practice: 643 - Restoration and Management of Rare and Declining Habitats**Scenario: #7 - Reef Creation-Live Oysters and Cultch****Scenario Description:**

Spat on Shell: 1 million oyster larvae are grown in an aquaculture facility on shell which are then placed on top of shell to improve the amount of living animals in order to improve regeneration of the developed or restored reef. Each setting will require 45 fish totes (0.11 cubic yards per tote). Shell will be placed in bags and transported to the aquaculture facility. Approximately 1 million larvae are added to the tank and they set on the shells. The oysters are set in the tanks for 7-10 days. The bags are then placed in the coastal ponds or estuaries until oysters grow to greater than or equal to 1". The oysters are placed on beds created from clean shell (45 totes 5 yards of clean shell average of 2"). The following process is used: 1. Collect shell for bagging-2 people for 2 days, 300 bags. (16 hours) 2. Spat on Shell includes setting, and transportation. ARC sets oysters goal is to plant ½ million at 1 inch or greater. In tank for 7-10 days. 3. Go back and pick up oysters. 1 day trucking 2 persons. Then bring out to area to grow out. 4 hours boat time plus 3 workers. 4. Oysters are grown out over June-October, normally 8 hours per week, 2 people. Boat time would be approximately 4 hours per week. 5. Place cultch on bottom. 5 yards or 3.5 tons of cultch (45 totes). 9 totes in a yard. 8 hours with boat, 4 laborers(32 hours) (3.5 tons of cultch are used to build the reef base prior to deployment of live oysters. 6. Oysters placed on cultch. 8 hours with boat, 4 laborers(32 hours) 7. Additional gear to grow out. Additional grow out bags 500-600. \$5.50 per bag, each cage holds 5-6 bags, \$12,000. 3 years is \$4,000 per year. 8. Oyster shell, \$1,500 per 300 bags. Scenario is based on 90 fish totes.

Before Situation:

Coastal estuaries and coastal ponds are lacking beneficial oyster beds. The oyster beds have been degraded or eliminated due to poor water quality, weather events, or disease. Beds have limited population of oysters or lack any oysters. This limits the natural regeneration of the beds. The lack of or decrease in oyster beds limits wildlife food and cover. Water quality is decreased due to a lack of filtering by the oysters.

After Situation:

The biological and structural components of the oyster beds are restored. These populated oysters can continue to re-seed the bed, as well as, surrounding beds. Native wildlife habitat is increased. There is an increase in both food and cover for native wildlife. Oysters that set on the beds provide increased water quality by additional filtering of the water.

Scenario Feature Measure: Totes**Scenario Unit:** Each**Scenario Typical Size:** 90**Scenario Cost:** \$30,515.43**Scenario Cost/Unit:** \$339.06**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Boat, 150 HP	2407	22 foot boat with 150hp motor used to place cultch to create reef habitat.	Hour	\$166.76	96	\$16,008.96
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$38.19	8	\$305.52
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$24.48	220	\$5,385.60
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$101.60	48	\$4,876.80
Materials						
Hatchery Seed Oysters	2635	Hatchery produced oyster seed with spat grown to 1" to 2" for Oyster Reef Restoration. Component unit "Each" refers to 1,000 count. Includes materials and shipping from hatchery to dockside.	Each	\$3.50	1000	\$3,500.00
Cultch	2409	Cultch material (used and/or slightly crushed, cleaned, medium to large sized shells). Includes materials only.	Ton	\$62.65	7	\$438.55

Practice: 643 - Restoration and Management of Rare and Declining Habitats**Scenario: #8 - Creation of Oyster Reef Coastal Pond****Scenario Description:**

Oyster reef are restored in shallow coastal pond or bays. These areas have limited access. Oyster reefs are created using clean cultch that is purchased from local shellfish processing plants. The typical unit size is 1100 square feet. Clean shell is placed in totes and loaded on boats to be taken to the reef restoration location. Shell is place using manual labor on pre-selected sites. Volume of shell is usually 40 yards per 1/10 acre or 10 yards per 1100 square feet. Shell is place in linear or concentric piles.

Before Situation:

Coastal estuaries and coastal ponds are lacking beneficial oyster beds. The oyster beds have been degraded or eliminated due to poor water quality, weather events, or disease. Beds have limited population of oysters or lack any oysters. This limits the natural regeneration of the beds. The lack of or decrease in oyster beds limits wildlife food and cover. Water quality is decrease due to a lack of filtering by the oysters.

After Situation:

The biological and structural components of the oyster beds are restored. These populated oysters can continue to re-seed the bed, as well as, surrounding beds. Native wildlife habitat is increased. There is an increase in both food and cover for native wildlife. Oysters that set on the beds provide increased water quality by additional filtering of the water.

Scenario Feature Measure: Totes**Scenario Unit:** Each**Scenario Typical Size:** 90**Scenario Cost:** \$6,099.73**Scenario Cost/Unit:** \$67.77**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$38.19	4.5	\$171.86
Boat, 150 HP	2407	22 foot boat with 150hp motor used to place cultch to create reef habitat.	Hour	\$166.76	12	\$2,001.12
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$39.49	4	\$157.96
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$24.48	56	\$1,370.88
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$40.82	48	\$1,959.36
Materials						
Cultch	2409	Cultch material (used and/or slightly crushed, cleaned, medium to large sized shells). Includes materials only.	Ton	\$62.65	7	\$438.55

Practice: 643 - Restoration and Management of Rare and Declining Habitats**Scenario: #9 - Oyster Reef Barge Crane****Scenario Description:**

Restoration of native oyster beds by placing oyster shells to form beds in coastal estuaries or coastal ponds. Typically requires 100 tons of shells placed on the bottom of the coastal estuary. The shell is transported to the site via a barge. The transportation and placement of the shell usually takes three days. Normally 100 tons of oyster or clam shell is dried over winter to remove disease and placed on the bottom in strategic locations based on bathymetric positions in the estuary. The shell creates habitat for both the oysters and other native wildlife.

Before Situation:

Coastal estuaries and coastal ponds are lacking beneficial oyster beds. The oyster beds have been degraded or eliminated due to poor water quality, weather events, or disease. The lack of or decrease in oyster beds limits wildlife food and cover. Water quality is decrease due to a lack of filtering by the oysters

After Situation:

The structural components of the oyster beds are restored. These beds can be seeded by native oyster population. Native wildlife habitat is increased. There is an increase in both food and cover for native wildlife. Oysters that set on the beds provide increased water quality by additional filtering of the water.

Scenario Feature Measure:

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: \$19,120.01

Scenario Cost/Unit: \$19,120.01

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Track Loader, 95HP	935	Equipment and power unit costs. Labor not included.	Hour	\$90.95	8	\$727.60
Barge with crane and operator	2408	Barge to transport and place 1 ton bags of cultch to form oyster reef habitat.	Hour	\$376.61	27	\$10,168.47
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$40.82	27	\$1,102.14
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$24.48	35	\$856.80
Materials						
Cultch	2409	Cultch material (used and/or slightly crushed, cleaned, medium to large sized shells). Includes materials only.	Ton	\$62.65	100	\$6,265.00